Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1-13. (cancelled)

14. (currently amended) A ball grid array (BGA) package, comprising:

a substrate that has a first surface and a second surface;

a stiffener that has a first surface and a second surface, and wherein said second surface of said stiffener is attached to said first surface of said substrate, wherein said stiffener has a plurality of openings formed therethrough that are each open at said first surface of said stiffener and said second surface of said stiffener~~, wherein~~;

an integrated circuit die ~~can be~~ mounted to said first surface of said stiffener; ~~and~~

a plurality of solder balls attached to said second surface of said substrate; and

at least one wire bond that couples at least one bond pad on a surface of said integrated circuit die to said first surface of said stiffener;

wherein said substrate has a window opening that exposes a portion of said second surface of said stiffener;

wherein said exposed portion of said second surface of said stiffener is configured to be ~~coupled~~ mounted to a printed circuit board (PCB) to form an electrical and thermal path to the PCB, whereby heat is conducted over the thermal path from said integrated circuit die to the PCB during operation of said integrated circuit die; and

~~whereby~~ wherein a plurality of wire bonds attached to [[an]] bond pads of said integrated circuit die ~~can be~~ are attached to said first surface of said substrate through said plurality of openings.

15-17. (cancelled)

18. (previously presented) The package of claim 14, wherein said stiffener has a centrally-located cavity shaped portion that protrudes through said window opening, wherein a surface of said cavity shaped portion forms at least a portion of said exposed portion of said second surface of said stiffener.

19. (previously presented) The package of claim 18, wherein said surface of said cavity shaped portion is plated with solder that allows said stiffener to be surface mounted to at least one soldering pad on the PCB.

20. (currently amended) The package of claim 14, wherein said stiffener is coupled to a first potential~~, wherein said package further comprises:~~

~~an integrated circuit (IC) die that is mounted to said first surface of said stiffener~~.

21. (currently amended) The package of claim 20, wherein said at least one bond pad on said surface of said integrated circuit die is a ~~IC die has a surface that includes at least one~~ ground potential pad, whereby said stiffener operates as a ground potential plane ~~wherein said package further comprises:~~

~~a ground wire bond corresponding to each of said at least one ground pad, wherein each said ground wire bond couples said corresponding ground pad to said first surface of said stiffener~~.

22. (original) The package of claim 14, wherein said substrate is a tape substrate.

23-39. (cancelled)

40. (withdrawn) A method of assembling a ball grid array (BGA) package, comprising the steps of:

providing a substrate that has a first surface and a second surface;

attaching a first surface of a stiffener to the first substrate surface;

exposing a portion of the first stiffener surface through a window opening in the substrate;

mounting an IC die to a second stiffener surface, wherein a surface of the IC die includes at least one contact pad; and

attaching a plurality of solder balls to the second substrate surface;

configuring the exposed portion of the first stiffener surface to be coupled to a printed circuit board (PCB), whereby electrical and thermal performance of the BGA package is improved.

41-42. (cancelled)

43. (withdrawn) The method of claim 40, wherein said configuring step comprises the step of:

shaping the stiffener to have a centrally-located cavity shaped portion that protrudes through the window opening.

44. (withdrawn) The method of claim 43, wherein said configuring step further comprises the step of:

plating a surface of the cavity shaped portion with solder to allow the stiffener to be surface mounted to soldering pads on the PCB.

45. (withdrawn) The method of claim 40, further comprising the steps of:

coupling the stiffener to a potential;

coupling each of the at least one contact pads to the second stiffener surface with corresponding wire bonds.

46. (withdrawn) The method of 45, wherein the stiffener coupling step comprises the steps of:

coupling the stiffener to a ground potential; and

allowing the stiffener to serve as a ground plane.

47-59. (cancelled)

60. (previously presented) The package of claim 14, wherein said substrate is an organic substrate.

61-62. (cancelled)

63. (currently amended) An apparatus for stiffening a ball grid array (BGA) package, comprising:

a stiffener that has a first surface and a second surface, wherein said stiffener has a plurality of openings formed therethrough that are each open at said first surface and said second surfaces of said stiffener, wherein an integrated circuit die ~~can be~~ is mounted to said first surface of said stiffener;

wherein said second surface of said stiffener is configured to attach to a substrate of the BGA package; ~~and~~

wherein said stiffener has a cavity-shaped portion that is configured to protrude through a window-shaped opening in the substrate, thereby exposing a portion of said second surface of said stiffener when said second surface of said stiffener is attached to the substrate; ~~and~~

wherein the exposed portion of said second surface of said stiffener is configured to be mounted to a printed circuit board (PCB) to form an electrical and thermal path to the PCB, whereby heat is conducted over the thermal path from the integrated circuit die to the PCB during operation of the integrated circuit die;

wherein a plurality of wire bonds attached to [[an]] bond pads of the integrated circuit die can be attached to the substrate through said plurality of openings when ~~the~~ said second surface of said stiffener is attached to the substrate; and

wherein at least one wire bond couples at least one bond pad on a surface of the integrated circuit die to said first surface of said stiffener.

64. (cancelled)

65. (currently amended) The ~~package~~ apparatus of claim 63, wherein said stiffener is coupled to a first potential.

66. (cancelled)

67. (currently amended) The ~~package~~ apparatus of claim 6[[6]]3, wherein ~~said IC~~ the integrated circuit die is mounted to said first surface of said stiffener in said cavity-shaped portion of said stiffener.

68. (currently amended) The ~~package~~ apparatus of claim 6[[6]]3, wherein ~~said IC die has a surface that includes a ground signal pad, wherein said package further comprises: a wire bond that couples said~~ the at least one bond pad is a ground signal pad ~~to said first surface of said stiffener~~ so that said stiffener operates as a ground plane.

69. (currently amended) The ~~package~~ apparatus of claim 6[[6]]3, wherein ~~said IC die has a surface that includes a power signal pad, wherein said package further comprises: a wire bond that couples said~~ the at least one bond pad is a power signal pad ~~to said first surface of said stiffener~~ so that said first stiffener operates as a power plane.

70. (currently amended) A ball grid array (BGA) package, comprising:

a substrate that has a window-shaped opening; ~~and~~

a stiffener that has a first surface and a second surface, wherein said second surface of said stiffener is attached to said substrate, wherein said stiffener has a plurality of openings formed therethrough that are each open at said first surface and said second surface of said stiffener~~, wherein~~; and

an integrated circuit die ~~can be~~ mounted to said first surface of said stiffener; ~~and~~

wherein said stiffener has a cavity-shaped portion that protrudes through said window-shaped opening, thereby exposing a portion of said second surface of said stiffener; ~~and~~

wherein the exposed portion of said second surface of said stiffener is configured to be mounted to a printed circuit board (PCB) to form an electrical and thermal path to the PCB, whereby heat is conducted over the thermal path from said integrated circuit die to the PCB during operation of said integrated circuit die;

wherein a plurality of wire bonds attached to [[an]] bond pads of said integrated circuit die can be attached to said substrate through said plurality of openings; and

wherein at least one wire bond couples at least one bond pad on a surface of said integrated circuit die to said first surface of said stiffener.

71. (cancelled)

72. (previously presented) The package of claim 70, wherein said stiffener is coupled to a first potential.

73. (cancelled)

74. (currently amended) The package of claim 7[[3]]0, wherein said IC die is mounted to said first surface of said stiffener in said cavity-shaped portion of said stiffener.

75. (currently amended) The package of claim 7[[3]]0, wherein ~~said IC die has a surface that includes a ground signal pad, wherein said package further comprises: a wire bond that couples said~~ the at least one bond pad is a ground signal pad ~~to said first surface of said stiffener~~ so that said stiffener operates as a ground plane.

76. (currently amended) The package of claim 7[[3]]0, wherein ~~said IC die has a surface that includes a power signal pad coupled to a power potential signal in said IC die, wherein said package further comprises: a wire bond that couples said~~ the at least one bond pad is a power signal pad ~~to said first surface of said stiffener~~ so that said stiffener operates as a power plane.

77. (currently amended) A stiffener for use in a ball grid array (BGA) package, comprising:

a first surface that is configured to mount an integrated circuit die;

a second surface that is configured to attach to a BGA package substrate;

a plurality of openings formed therethrough that are each open at said first surface and said second surface of said stiffener; and

a cavity-shaped portion that is configured to protrude through a window-shaped opening in the BGA package substrate when attached, to expose a portion of said second surface;

wherein said exposed portion of said second surface is configured to be mounted to a printed circuit board (PCB) to form an electrical and thermal path to the PCB, whereby heat is conducted over the thermal path from said integrated circuit die to the PCB during operation of said integrated circuit die;

wherein a plurality of wire bonds attached to an integrated circuit die can be attached to the BGA package substrate through said plurality of openings; and

wherein at least one wire bond couples at least one bond pad on a surface of the integrated circuit die to said first surface.

78. (currently amended) The stiffener of claim 77, wherein a portion of said second surface is plated to facilitate attachment to ~~a~~ the ~~printed circuit board (~~PCB~~)~~.

79. (previously presented) The stiffener of claim 78, wherein said portion of said second surface is plated with a metal that comprises a solder material.

80. (previously presented) The package of claim 14, wherein said stiffener substantially covers said first surface of said substrate.

81. (previously presented) The package of claim 80, wherein outer edges of the stiffener are substantially even with outer edges of the substrate.

82. (currently amended) The ~~package~~ apparatus of claim 63, wherein, when said second surface of said stiffener is attached to the substrate, said stiffener substantially covers a surface of the substrate to which said second surface of said stiffener is attached.

83. (currently amended) The ~~package~~ apparatus of claim 82, wherein, when said second surface of said stiffener is attached to the substrate, outer edges of the stiffener are substantially even with outer edges of the substrate.

84. (previously presented) The package of claim 70, wherein said stiffener substantially covers a surface of said substrate to which said second surface of said stiffener is attached.

85. (previously presented) The package of claim 84, wherein outer edges of the stiffener are substantially even with outer edges of the substrate.

86. (previously presented) The package of claim 77, wherein, when said second surface of said stiffener is attached to the BGA package substrate, said stiffener substantially covers a surface of the BGA package substrate to which said second surface of said stiffener is attached.

87. (previously presented) The package of claim 86, wherein, when said second surface of said stiffener is attached to the BGA package substrate, outer edges of the stiffener are substantially even with outer edges of the BGA package substrate.